

WHAT IS CLAIMED IS:

- 1 1. A carrier for a semiconductor die package, the carrier comprising:
 - 2 (a) a metal layer; and
 - 3 (b) a plurality of bumps formed in the metal layer,
 - 4 wherein the carrier is for electrically coupling a semiconductor die to a circuit
 - 5 substrate.
- 1 2. The carrier of claim 1 wherein the metal layer comprises copper.
- 1 3. The carrier of claim 1 wherein the plurality of bumps are disposed in
2 an array and are stamped bumps.
- 1 4. The carrier of claim 1 further comprising:
2 a die attach region, and wherein the plurality of bumps are arranged around the
3 die attach region.
- 1 5. The carrier of claim 1 further comprising a dielectric layer, wherein the
2 metal layer is on a dielectric layer.
- 1 6. The carrier of claim 1 wherein the metal layer includes one or more
2 sublayers of material on a base metal.
- 1 7. The carrier of claim 1 wherein the metal layer is discontinuous and
2 includes a plurality of etched conductive lines that lead to the plurality of bumps.
- 3 8. The carrier of claim 1 wherein each bump has a conical angle of about
4 40 degrees of more.
- 1 9. The carrier of claim 1 wherein each bump has a conical shape.
- 1 10. A semiconductor die package comprising:
 - 2 (a) a carrier comprising a metal layer, a die attach region, and a plurality
 - 3 of bumps formed in the metal layer; and
 - 4 (b) a semiconductor die electrically coupled to the die attach region of the
 - 5 carrier.

- 1 11. The die package of claim 10 wherein the plurality of bumps are
2 stamped bumps and are arranged around the die attach region, and wherein each of the bumps
3 has a height that is greater than or equal to a thickness of the semiconductor die.
- 1 12. The die package of claim 10 wherein the carrier comprises copper.
- 1 13. The die package of claim 10 wherein the carrier comprises:
2 a base metal with one or more coatings on the base metal.
- 1 14. The die package of claim 10 wherein each bump has a conical angle
2 greater than about 40 degrees.
- 1 15. The die package of claim 10 wherein the semiconductor die comprises
2 a vertical metal oxide semiconductor field effect transistor (MOSFET) device.
- 1 16. The die package of claim 10 wherein the semiconductor die comprises
2 a vertical metal oxide semiconductor field effect transistor (MOSFET) device having a source
3 region, a gate region, and a drain region, wherein the drain region is proximate to the die
4 attach region of the carrier, and the source region and the gate region are distal to the die
5 attach region of the carrier.
- 1 17. The die package of claim 10 wherein each stamped bump has a conical
2 shape.
- 1 18. The die package of claim 10 wherein the bumps and the semiconductor
2 die are at opposite sides of the carrier.
- 1 19. The die package of claim 10 wherein the bumps and the semiconductor
2 die are at the same side of the carrier.

1 20. A semiconductor die package comprising:
2 (a) a carrier comprising metal layer, a die attach region, and a plurality of
3 stamped bumps formed in the metal layer around the die attach region;
4 (b) a semiconductor die comprising a vertical metal oxide semiconductor field
5 effect transistor (MOSFET) device having a source region, a gate region, and a drain region,
6 wherein the drain region is electrically coupled to and proximate to the die attach region of
7 the carrier, and the source region and the gate region are distal to the die attach region, and
8 wherein the plurality of stamped bumps in the carrier are arranged around the semiconductor
9 die; and
10 (c) a plurality of solder deposits disposed on the semiconductor die.

1 21. The semiconductor die package of claim 20 wherein the each of the
2 bumps has a conical angle greater than about 40 degrees or more.

1 22. The semiconductor die package of claim 20 wherein the carrier
2 comprises copper.

1 23. The semiconductor die package of claim 20 the plurality of bumps are
2 formed simultaneously in the metal layer.

1 24. A method for forming a carrier for a semiconductor die package, the
2 method comprising:
3 (a) providing a metal layer; and
4 (b) forming a plurality of bumps in the metal layer, wherein the formed
5 bumps are capable of being electrically coupled to conductive regions of a circuit substrate.

1 25. The method of claim 24 wherein forming the plurality of bumps
2 comprises stamping.

1 26. A method for forming a semiconductor die package, the method
2 comprising:
3 (a) forming a carrier according to the method of claim 24; and
4 (b) attaching a semiconductor die to the metal layer after forming the
5 plurality of bumps.

1 27. The method of claim 26 wherein (c) attaching comprises:
2 attaching the semiconductor die to a die attach region of the carrier, and
3 wherein the plurality of bumps is disposed around the semiconductor die.

1 28. The method of claim 26 wherein forming the plurality of bumps
2 comprises stamping.

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